

WHAT IS CLAIMED IS:

1. A cooling device including:
 - a cooling unit, capable of cooling an object by vaporizing an operating medium with heat from said object;
 - a condensing unit, physically separated from said cooling unit, and capable of condensing the vaporized operating medium vaporized in said cooling unit and circulating the condensed operating medium to said cooling unit;
 - a first tube, through which the condensed operating medium flows from said condensing unit to said cooling unit; and
 - a second tube, through which the vaporized operating medium flows from said cooling unit to said condensing unit.
2. The cooling device according to claim 1, wherein said cooling unit includes:
 - a first substrate, provided with a groove except for a wick;
 - a second substrate, formed of a metal or a material having a thermal conductivity equivalent to that of a metal, and provided with at least a wick; and
 - a third substrate, having a surface incorporating said second substrate, wherein said surface of said third

substrate is joined with said first substrate.

3. The cooling device according to claim 2, wherein said second substrate is formed of copper, and wherein a thin film of copper I oxide is formed on the surface of said wick.

4. The cooling device according to claim 1, wherein at least one of said first tube and said second tube is formed of a fluorocarbon resin.

5. The cooling device according to claim 4, wherein at least one of joints between a unit and a tube is coated with a self-bonding fluorocarbon resin, wherein said unit is selected from the group consisting of said cooling unit and said condensing unit, and wherein said tube is selected from the group consisting of said first tube said second tube.

6. The cooling device according to claim 5, wherein at least one surface of said joint of a tube with a unit is treated with plasma or reactive ion etching, wherein said tube is selected from the group consisting of said first tube and the second tube, and wherein said unit is selected from the group consisting of said cooling unit and said condensing unit.

7. The cooling device according to claim 6, wherein at least one surface of said joint of a tube with a unit is treated with plasma or reactive ion etching, wherein said tube is selected from the group consisting of said first tube and the second tube, and wherein said unit is selected from the group consisting of said cooling unit and said condensing unit.

8. The cooling device according to claim 1, wherein at least one of the surfaces of said first tube and said second tube has a metal thin film formed thereon.

9. The cooling device according to claim 8, wherein said metal thin film include at least one selected from the group consisting of Cu, Al, Ni, Ti, Au, Pt, Ag, Cr, Fe, Zn, Co, Si, Sn, In and Pb.

10. The cooling device according to claim 1, wherein at least one of said first tube and said second tube contains at least one material, selected from the group consisting of silicone rubber, polyurethane, and polypropylene.

11. The cooling device according to claim 10, wherein

at least one of the outer and inner surfaces of said first tube and said second tube is coated with a fluorocarbon resin.

12. An electronic apparatus comprising:
 - a central processing unit;
 - a cooling unit, disposed adjacent to said central processing unit, and capable of cooling an object by vaporizing an operating medium with heat from said object;
 - a condensing unit, physically separated from said cooling unit, and capable of condensing the vaporized operating medium vaporized in said cooling unit and circulating the condensed operating medium to said cooling unit;
 - a first tube, through which the condensed operating medium flows from said condensing unit to said cooling unit; and
 - a second tube, through which the vaporized operating medium flows from said cooling unit to said condensing unit.

13. The electronic apparatus according to claim 12, wherein said cooling unit has an area that is substantially equal to the area of said central processing unit.

14. An electronic apparatus, having a slot through

which a card memory device comprising a flash memory and a driver is capable of being inserted therein or removed therefrom, said electronic apparatus comprising:

a cooling unit, being disposed adjacent to said slot, and being capable of cooling an object by vaporizing an operating medium with heat from said object;

a condensing unit, being physically separated from said cooling unit, and being capable of condensing the vaporized operating medium vaporized in said cooling unit and circulating the condensed operating medium to said cooling unit;

a first tube, through which the condensed operating medium flows from said condensing unit to said cooling unit; and

a second tube, through which the vaporized operating medium flows from said cooling unit to said condensing unit.

15. An electronic apparatus, including:

an operating unit having at least a central processing unit;

a cooling unit, being disposed adjacent to said central processing unit, and being capable of cooling an object by vaporizing an operating medium with heat from said object;

a display unit, being physically separated from said cooling unit, and having a condensing unit that is capable

of condensing the vaporized operating medium vaporized in said cooling unit;

a coupling unit, being capable of collapsibly coupling a side of said operating unit and a side of said display unit;

a first tube disposed between said condensing unit and said cooling unit by said coupling unit, wherein the condensed operating medium flows from said condensing unit to said cooling unit through said first tube; and

a second tube disposed between said condensing unit and said cooling unit by said coupling unit, wherein the vaporized operating medium flows from said cooling unit to said condensing unit through said second tube.

16. An acoustic apparatus, having a power transistor, comprising:

a cooling unit, being capable of cooling said power transistor by vaporizing an operating medium with heat from said object;

a condensing unit, being physically separated from said cooling unit, and being capable of condensing the vaporized operating medium vaporized in said cooling unit and circulating the condensed operating medium to said cooling unit;

a first tube, through which the condensed operating

medium flows from said condensing unit to said cooling unit;
and

a second tube, through which the vaporized operating medium flows from said cooling unit to said condensing unit.

17. A method for producing a cooling device,
comprising:

producing a cooling unit, which is capable of cooling an object by vaporizing an operating medium with heat from said object;

producing a condensing unit, which is physically separated from said cooling unit, and is capable of condensing the vaporized operating medium vaporized in said cooling unit and circulating the condensed operating medium to said cooling unit;

coupling a first tube between said cooling unit and said condensing unit, wherein the condensed operating medium is capable of flowing from said condensing unit to said cooling unit through said first tube; and

coupling a second tube between said cooling unit and said condensing unit, wherein the vaporized operating medium is capable of flowing from said cooling unit to said condensing unit through said second tube.

18. The method according to claim 17, further

comprising: forming a thin film of copper I oxide on a wick surface that is provided on said cooling unit.

19. The method according to claim 17, wherein at least one of said first tube and said second tube is formed of a fluorocarbon resin.

20. The method according to claim 19, further comprising: forming a coating of self-bonding fluorocarbon resin onto at least one of joints between a unit and a tube, wherein said unit is selected from the group consisting of said cooling unit and said condensing unit, and wherein said tube is selected from the group consisting of said first tube said second tube.

21. The method according to claim 19, further comprising: treating said fluorocarbon resin surface with hydrogen plasma.

22. The method according to claim 17, further comprising: forming a metal thin film on at least one of the surfaces of said first tube and said second tube.

23. The method according to claim 22, wherein said metal thin film includes at least one selected from the

group consisting of Cu, Al, Ni, Ti, Au, Pt, Ag, Cr, Fe, Zn, Co, Si, Sn, In and Pb.

24. The method according to claim 17, wherein at least one of said first tube and said second tube contains at least one material selected from the group consisting of silicone rubber, polyurethane, and polypropylene.

25. The method according to claim 24, further comprising: forming a coating of fluorocarbon resin onto at least one of the outer and inner surfaces of said first tube and said second tube.